361 feet. The lake has only a small and shallow outflow, the river Zanga, running into the Araks. The fauna of the lake and of its shores is varied. *Spongillæ*, not determined as yet, are very numerous. Among the *Vermes* the most common is the *Nephelis vulgaris*; the *Crustacea* are represented by a variety of microscopical forms and by a species of *Gammarus*, this species being probably all but the only representative of that kind, as the dredging was not pursued to depths greater than 150 feet. The snails are remarkably numerous, and all belong to species common in European lakes (*Limnæus stagnalis*, *L. ovatus*, *L. varicularius*, and *Planorbis carinatus*); they differ only by their unusually fine and brittle shales. The common frog (a local variety) and the *Bufo viridis* are numerous. The number of fishes is immense, but they belong to only five species, of which three are new. These three, which occupy an intermediate position between the *Salmo fario* and the *S. trutta* and *S. lanestris*, will be described by Prof. Kessler under the names of *Salmo ischan*, *S. hegarkuni*, and *S. bodschac*. The fourth species of fishes is very nearly allied to the *Capoeta fundulus*, Pall., a species most characteristic of Central Asian waters. The fifth is akin to the *Barbus cyri*, De Fillipi; it inhabits mostly the short and cold rivers running from the mountains.

ANTS.—Mr. McCook has recently brought before the Academy of Natural Sciences of Philadelphia, an account of his investigations on *Formica rufa*. He finds that ants descending the tree-paths, with abdomens swollen with honey-dew, are arrested at the foot of the trees by workers from the ant-hill. The descending ant places its mouth in contact with that of the food-seeker, the two being reared on hind legs. Frequently two or three of its fellows are thus fed in succession by one ant, mostly complacently, but sometimes only on compulsion. Mr. McCook made many experiments, which lead to the conclusion that there is complete amity between the ants of a large field, embracing some 1,600 hills, and many millions of creatures. Insects from hills widely separated always fraternised completely. A number of ants from various hills were placed in an artificial nest, and harmoniously built galleries and jointly cared for the cocoons.

NEW FORMS OF HALIPHYSEMA.—The second half of the second volume of *Biologische Studien*, by Dr. E. Haeckel, has just reached us. It contains an account of a wonderful family of minute forms belonging to the genera Haliphysema and Gastrophysema, and some supplementary remarks on the Gastræa theory. Six plates illustrative of the new forms accompany this part. The genus Haliphysema was established by Bowerbank for *H. tumanowiczii* and *H. ramulosum*. The species described as *H. echinoides* seems almost certainly to be that described in 1870, by Perceval Wright, as *Wallichii*, but the two new species described as *H. primordiale* and *H. globigerina*, the latter with a mosaic of Globigerina shells laid over it, are most extraordinary and interesting forms. The presence of a pore area in the tiny form figured in the previous note seems to points to its no having any close affinity to this new family of Haeckel.

NOTES

PROF. SIR C. WYVILLE THOMSON, F.R.S., has been appointed Rede Lecturer at Cambridge for the ensuing year. Sir Wyville Thomson will deliver a lecture in the Easter term.

A BOTANICAL Congress assembles at Amsterdam on the 12th of April.

THE Iron and Steel Institute meets in London on March 20 and following days. On Wednesday, the 21st, at the rooms of the Institution of Civil Engineers, Dr. Siemens, F.R.S., will deliver his inaugural address, and the Bessemer Medal will be presented to Dr. Percy. A number of important practical papers are set down for reading.

CAPT. ALLEN YOUNG has presented to the Museum of the Royal College of Surgeons a collection of the skulls of Esquimaux obtained by himself and the surgeon of his vessel, Mr. Horner, during the last cruise of the *Pandora*. The honour of knighthood has been conferred upon Capt. Young.

SIR JOHN LUBBOCK'S Ancient Monuments Preservation Bill was, we are glad to say, read a second time in the House of Commons on Wednesday week. We hope none of its important provisions will be impaired in the select committee to which it has been referred, but that it will be passed essentially as it stands.

THE *American Chemist* for December, 1876, contains an interesting Inaugural Address to the American Chemical Society on "Science in America," by Dr. J. W. Draper. The Address on a similar subject by Vice-President C. A. Young, at the last meeting of the American Association for the Advancement of Science, has been printed separately. In both addresses the important work done by Americans in various departments of science is justly insisted upon, and the future of science in America spoken of in hopeful terms. Men of science in England, we are sure, will heartily endorse all that Professors Draper and Young claim on behalf of their countrymen as original workers in science, and there is every reason to believe that there is a bright future for science in America.

As soon as the news that Mr. Edward, the Scottish Naturalist, had resigned the curatorship of the Banff Museum spread over the country, he was pressed to accept various situations, among others one in Aberdeen and another in Durham, the latter in the University of that city. He has been obliged to decline all these offers owing to the state of his health. He had been solicited by the Meteorological Society of London to become one of their observers. This request he had owing to the same cause declined. The work is, however, congenial, and does not demand a change of residence, and we believe he has yielded to a second very pressing application.

THE Sedgwick Prize, founded in honour of the late Prof. Sedgwick, for an essay on a geological subject, has been adjudged to Alfred John Jukes-Browne, B.A., of St. John's College, Cambridge. The subject of the essay is "The Post-tertiary deposits of Cambridgeshire, and their relation to deposits of the same period in the rest of East Anglia." The subject for the Sedgwick Prize to be awarded in 1880 is the best essay on "The Fossils and Palæontological Affinities of the Neocomean Beds of Upware, Wicken, and Brickhill." The prize is open to the competition of all graduates of the University of Cambridge who have resided sixty days during the twelvemonth preceding the day the essays must be sent in, that is, before October 1, 1880.

A PRELIMINARY meeting has been held in Paris by some influential followers of the Positive Philosophy for the purpose of establishing a course of lectures according to the system of Auguste Comte, as modified by Littré. Important resolutions were passed as to the teaching of the several sciences which, according to the theoretical view adopted by Comte, constitute the encyclopedic education. At the next meeting resolutions will be proposed for meeting the expenses of the institution and regulating its administration.

AN arrangement has been made with the Cassel publisher, Theodor Fischer, whereby the hitherto very expensive publication *Palæontographica*, will be published in yearly volumes at not more than forty-five shillings each.

THE Balloon Commission of the French Government, styling itself "Commission pour les Communications par Voie Aérienne," has become a standing institution, and includes within its province carrier pigeons as well as æronauts and balloons.

IN the *Journal of the Society of Arts* for March 9 will be found an important and interesting lecture by Prof. A. B. W. Kennedy, C.E., on "The Growth and Present Position of the Science of Machines."

THE unification of the meridian has been advocated at Rome before the Italian Society of Geography, by M. Boutillier de Beaumont, the president of the Geneva Geographical Society. He proposes to adopt the Behring meridian which has been chosen by the American meteorological service for the universal daily observations. M. Boutillier de Beaumont proposes also to adopt the division into hours of fifteen degrees for angular divisions as well as for temporal minutes.

MANY of us will have read with interest Capt. Wiggins' account of his endeavours to establish sea-communication with the great rivers of North Siberia, as given in the last number of the *Geographical Magazine*. Capt. Wiggins has now just started on his return to the Yenisei, overland, to bring back his ship which he stowed away in October last at Kureika, on that river. He is accompanied by Mr. Seebohm, F.Z.S., a distinguished member of the British Ornithologists' Union, who has embraced this opportunity of visiting the nesting-haunts of some of our rarest and least-known European birds, and otherwise exploring an almost unknown country.

A "SOCIÉTÉ des Voyages d'Études autour du Monde" has been constituted at Paris by the liberality of M. Bischofsheim and others. Its object is to organise a regular service of voyages round the world for the instruction of those who are able to afford the expense. The first departure is to take place from Marseilles in the end of May next. The voyage will occupy less than a full year. Opportunities will be given to cross South America from Monte Video to Valparaiso, and to visit the United States and India. The commander of the steamer will be M. Biard, a lieutenant in the National Navy and the promoter of the Society. Passengers may be registered up to April 10 next. A library, instruments for experiments, and a staff of competent teachers will be on board.

AMONG the papers in the January number of the *Bulletin* of the French Geographical Society are the following:—On a journey into the Sahara and to Rhadames, by M. Largeau; Across the Pampas, by M. Désiré Charnay; on the French Expedition to the Ogové, by M. Savorgnan de Brazza; a letter from Dr. Halub on his travels in South Africa.

WE regret to notice that the Marquis de Compiègne, the French West African explorer, has died of a wound received in a duel at Cairo.

A GEOGRAPHICAL Society was established at Marseilles in the beginning of March. The president of the new Society is M. Rambaud, a merchant who is acting as representative of the Sultan of Zanzibar. Not less than 200 members subscribing 1*l*. were registered, and donations have been collected to the amount of 800*l*. A public library has been opened, a course of public lectures on geography established, and the Society is arranging a Museum of Raw Materials from every country.

THE *Daily Telegraph* announces the receipt of important letters from Mr. Stanley, under date Ujiji, August 7 and 13. Mr. Stanley has made a complete survey of Lake Tanganyika, apparently settled the questions of outlet and level, and made important discoveries at the north end of the lake. He also describes his discoveries at and about the Nyanzas, though it does not appear that he has succeeded in circumnavigating Albert Nyanza. Mr. Stanley intended to cross the country to Nyangwe, where he would determine his final course.

AT the meeting of the Royal Geographical Society on Monday the business consisted of the reading of papers "On the Distribution of Salt in the Ocean," by Mr. J. Y. Buchanan; "A Journey through Formosa," by Mr. H. J. Allen; and "A Trip into the Interior of Formosa," by Mr. T. L. Bullock. The first paper summarised experiments which had been made during the cruise of the *Challenger* on the specific gravity and saline strength of the ocean water at various depths. 1,800 samples had been obtained, and by the testing of them Mr. Buchanan had ascertained, first, that the specific gravity of sea-water was greater than that of fresh; and, second, that the variations in its specific gravity pretty exactly indicated the amount of salt held in solution. It had been found that the water was freshest at the equator and at the poles, and most impregnated with salt in the intermediate regions. The papers on Formosa were descriptive of the journeys through the island taken by the respective readers, and entered into details of the character of the inhabitants—Chinese, semi-barbarians, and aborigines.

ON March 26 Sir George Nares will read a paper on the "Geographical Results of the Arctic Expedition," at the Royal Geographical Society.

WE have received from a correspondent a very detailed account (illustrated by drawings) of the Kimberley diamond mine in South Africa. The conclusion as to the mode of origin of the diamonds to which his study of the district appears to have led our correspondent is as follows:—That they were formed in volcanic vents which have been opened in the midst of sedimentary rocks (sandstone and shale, with thin coaly seams), which vents probably existed at a considerable depth under the sea. As to the material which by its decomposition may have yielded the pure carbon in a condition ready for crystallisation, our correspondent suggests that it was probably some hydrocarbon derived from the coal by distillation.

WE notice the following details on the Jurassic flora of Eastern Siberia in a memoir by Dr. Oswald Heer, published in the *Memoirs* of the St. Petersburg Academy of Sciences. This formation occupies about 200 miles along the shores of the Amoor, between the villages Oldoy and Vaganova, and borders, probably, the south-western foot of the Stanovoy ridge. In the Irkutsk government it occupies a large space in the south-eastern corner of this province, where the district around the village Ust-Baley (on the Angara, forty miles to the north of Irkutsk) will be now, after the appearance of Oswald Heer's description, one of the most typical representatives of the Jurassic flora, by its beautifully preserved plants, insects, and fishes. All Siberian Jurassic plants belong to the period of the Brown Jura, and their nearest relations are the Jurassic deposits of Scarborough and of Cape Bogeman, in Spitzbergen. They mostly belong to new species; the most common of previously-known species being only the *Asplenium* (*Pecopteris*) *Whithiense*, and the *Gingko Huttoni*. Three still existing kinds, *Asplenium*, *Thyrsopteris*, and *Dicksonia*, have their representatives among the East Siberian Jura. The most interesting group, by the variety of its forms, is the group of the Coniferæ (more than thirty species), and especially the group of the Salisburiæ. Altogether, the Siberian Jurassic flora occupies the first rank by the variety of species it affords (eighty-three species), the richest yet known flora, that of Yorkshire, numbering only seventy-three species.

A CORRESPONDENT writing from Knoxville, Tennessee, U.S., states that on two occasions he has witnessed true towering in wild ducks, one a call duck the other a summer duck. He adds to the list of towering birds already named the Virginia quail (*Ortyx virginianus*), and wild pigeon (*Ectopistés migratoria*).

A PRACTICAL Society of Natural History has been recently established in Paris under the title of Société Parisienne. Its special aim is to procure young people the means to study nature by lectures and excursions.

FROM researches on the nature of the vowel "clang," in Prof. Helmholtz's physical laboratory, M. Auerbach (*Pogg. Ann.*) comes to the following conclusions, which appear to throw new light on some unsolved problems:—1. All clangs, especially the vowels of the human voice and speech, are to be defined as the consequence of the joint action of two moments, a relative and an absolute. 2. The relative moment is the mode of distribution of the whole intensity among the individual partial tones as determined by their ordinal number. The absolute is the dependence of the whole intensity on the absolute pitch of the partial tones, and the modification of the distribution, on change of the fundamental tone, therewith connected. 3. The difference of the vowels in the former relation is a result of the power of changing the form of the mouth-cavity. The differences of the absolute pitches characterising the various vowels, and of their influence, are a result of the power of changing the volume and size of the mouth-cavity. 4. The first partial tone is always the strongest in clang; it deserves, therefore, the name of fundamental tone. 5. The intensity of the partial tones as such decreases in general as their ordinal number increases; exceptions indicate the nearness of the boundary of the consonant region. 6. The intensity of the partial tones decreases more slowly the nearer the vowel clang is, therefore more quickly the duller this is. 7. The characteristic pitch is higher the clearer, and deeper the duller, the vowel clang. 8. The variations of the intensity, in consequence of the influence of the characteristic pitch, are greater the fuller the vowel is. Very slight variations indicate the nearness of the consonant region. 9. All the vowels admit of being sung within the whole range of the human voice; but the dull speak in very high, the clear in very deep, positions. 10. A little attention only is needed to perceive in a vowel clang the over-tones (often comparatively very strong) without artificial aids. They then sound very similar to the pure tuning-fork tones.

CONTINUING his researches on fluorescence, M. Lommel (*Pogg. Ann.*) arrives at the following conclusions:—1. There are two kinds of fluorescence. In one each excitant homogeneous ray falling within the limits of the fluorescence-spectrum excites not only rays of greater and equal, but also rays of shorter wave length; the latter so far as they belong to the region in question. In the second kind, each homogeneous ray excites only rays of greater or equal wave length. 2. There are substances which have only the first kind of fluorescence; each excitant ray excites the whole fluorescence spectrum. Hence they are not subject to Stokes's law. Such are naphthalin, red chlorophyll, and eosin. 3. There are substances which have only the second kind of fluorescence, and which therefore, throughout their fluorescence spectrum, obey Stokes's law. Such are most of the fluorescent substances hitherto examined. 4. There are substances which have both kinds of fluorescence, so that the first kind is proper to a certain portion of their fluorescence spectrum, and the second kind proper to their remaining parts. Hence these obey Stokes's law only in part. Such are chamaelin red, blue, and green.

THERE are several ways of decomposing water with only one electrode. One is this: let some water in a glass be brought in contact with a Wollaston electrode (*i.e.*, a fine platinum wire inclosed in glass and touching the water only by its extreme section), and connect the wire with the conductor of an electric machine in action. Fine bubbles of oxygen are liberated at the point. What becomes of the hydrogen? M. Lippmann replies (*Journal de Physique*) that so long as the water continues charged the hydrogen remains in excess. On discharging the water it escapes at the platinum point, this being then the electrode of exit. But may it not be that the hydrogen is set at liberty within the liquid or at its surface while the corresponding oxygen is liberated (there being, according to this view, two electrodes, one the platinum point, the other diffuse and of large surface)? The objection, M. Lippman says, cannot be refuted by direct experiment, but the impossibility of the hypothesis appears on considering the quantities of chemical and electrical work called forth during the experiment. He gives two demonstrations of this.

WE have received the first two numbers of a new Italian monthly periodical, *l'Elettricista*, the object of which is to give an account of the progress of the science of electricity. This publication is one of many signs that the countrymen of Galileo have made up their minds again to take an active part in scientific investigation, and especially not to forget that branch which owes so much to Volta. The papers do not lay claim to originality, but the first number especially is interesting, and if kept up on the same standard the periodical can do a great service in spreading modern ideas in Italy. We note especially the paper on absolute electrical units, by Naccari, and on some phenomena presented by electrified powders, by A. Ricco. The second number contains chiefly abstracts from foreign periodicals. Padre Secchi draws some conclusions from imaginary results, which he believes were obtained by Mr. Chrystal in his verification of Ohm's law.

IN a paper read the other day by M. Fulke, before the Wissenschaftlicher Club of Vienna, on German emigration to the United States, it was estimated that from 1820 to the present, nearly 10,000,000 must have emigrated, or a fourth of the entire population of the United States. M. Fulke lamented the extent of the movement, also the facility with which the Germans in America seemed to lay aside their customs and usages, and even their native tongue. In conclusion, he drew a parallel between the Germans in the United States, and the Germans in the whole of Austria. Here, too, the German element was about a fourth of the whole population, but what a contrast to the other case!

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus radiatus*) from India, presented by Mrs. Payton; a Rose Hill Parrakeet (*Platycercus eximius*) from Australia, presented by Mr. J. J. Chapman; a Rufous-vented Guan (*Penelope cristata*) from Central America, presented by Mr. Daniel Miron; two Hooded Crows (*Corvus cornix*), European, presented by Mr. F. Cresswell; a Macaque Monkey (*Macacus cynomolgus*) from India, deposited; a Two-Wattled Cassowary (*Casuarius bicarunculatus*) from the Aroo Islands, a Hooded Crane (*Grus monachus*) from Japan, a Hodgson's Barbet (*Megalæma hodgsoni*), two Striated Jay Thrushes (*Grammatopila striata*), three Black-headed Sibias (*Sibia capistrata*), three Brown-eared Bulbuls (*Hemixos flavala*), two Rufous-bellied Bulbuls (*Hypsipetes Mclellandi*), a Red-headed Laughing Thrush (*Trochalopteron erythrocephalum*) from the Himalayas, purchased.

SCIENTIFIC SERIALS

FROM the *Naturforscher* (January, 1877) we note the following papers:—On radiation in space, by H. Buff.—On cave-insects, by L. Bedel and E. Simon.—On the germination of the fruits of mosses, by P. Magnus.—On the action of a di-electric body upon an electric one, by R. Felici.—On the preparation of pure alcohol yeast, by Moritz Traube.—On the limit between chalk and tertiary deposits in the Rocky Mountains (U.S.), by M. Delafontaine.—New researches on Bacteria, by E. v. M.—On the specific power of glycose (grape sugar) of turning the plane